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A place of safe refuge in the event of violent natural forces or a tornado should be included in the design of all new school buildings. Existing a school buildings should be analyzed by the architect, contractor, or engineer to determine if a safe place exists or if one can be readily adapted. Most criteria for fallout shelters are the same for natural disaster shelters and free technical assistance is available through local and state civil defense agencies. Tornado alarm systems should be different or a variation of the regular fire alarm and a secondary system should be available in case the power supply is disrupted. (LD)

TORNADO EMERGENCY READINESS PLANNING FOR SCHOOLS

Wisconsin Department of Public Instruction William C. Kahl, State Superintendent

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Introduction

The possibility that a school might be struck by a disastrous tornado, a gas explosion or nuclear radiation is a reality that the school administrator must face. Topeka... Belmond... Orrick... Belvidere. The destruction left by tornadoes is all too vivid to be forgotten.

Just as those disasters are a reality, every school should have a practical, well-defined plan for disasters. Such a plan serves both an educational goal and as an emergency measure. Understanding disasters and placing them in their proper perspective is a continuing educational process that dispels the panic that can cause injury and death.

School authorities are morally and legally responsible for the health, safety and well-being of the students and personnel under their care. It is extremely important that the school board and administrator put a disaster plan on paper, delegating responsibilities, notifying parents, and holding regular drills so that all persons concerned can meet an emergency situation.

This guideline is published by the State Department of Public Instruction, with the cooperation of the State Bureau of Civil Defense & Disaster Control and the U.S. Weather Bureau to help you prepare an "Emergency Readiness" Plan. School officials should coordinate their plan with a County/Municipal Civil Defense plan.

The guideline deals primarily with tornadoes. While some of the information may be applied to other types of disaster, it is recommended that

school officials contact the Department of Public Instruction or a Civil Defense Director when developing other areas of their total "Emergency Readiness" Plan.

New school buildings are not specifically required to include an area that would offer refuge in the event of a severe windstorm or tornado. While state or local building code regulations do enforce certain structural requirements for schools, they are not rigid enough to provide resistance for violent natural forces.

It is suggested that a place of safe refuge be included in the design of all new buildings. Existing school buildings should be analyzed to determine if a safe area exists or if one can be readily adapted. Most of the criteria used in evaluating fallout shelters is the same for natural disaster shelters and free technical assistance is available to the designer and owner through the local and State Civil Defense agencies. It is hoped that school officials and designers take advantage of this service.

The Department of Public Instruction's monthly Newsletter will keep the administrators posted on new Emergency Readiness procedures and techniques that come to our attention as well as give tornado season reminders.

Warning System

Time is of the greatest importance in implementing an "Emergency Readiness" Plan. For this reason, consideration must be given to the Wisconsin State Warning System and how it can be utilized for warning of severe weather, nuclear radiation, or other pending emergencies. The general warning system is for state, county and community needs; and the school, as a part of these units, should be an important link in the system. Not only should the school be a recipient of emergency information from the system, but it should act to provide classroom instruction to the elementary, junior high, and high school student on the nature of various emergencies and how the individual may cope with them.

The National Severe Storm Forecast Center, ESSA Weather Bureau Kansas City, has the main responsibility for issuing tornado and severe thunderstorm watches for Wisconsin as well as the entire nation. These watches (forecasts) are released to the public, police services and Civil Defense offices by the Weather Bureau stations in Wisconsin: Milwaukee, Madison, Green Bay and La Crosse. A tornado warning (actual sighting) or severe thunderstorm warning (actual sighting) is issued by each Weather Bureau for its specific county responsibility area. Again, the means of dissemination of this information are: The National Warning System (NAWAS), State Patrol

Communications, press wires, amateur radio and telephones. Weather radar coverage for the state is provided by the Weather Bureau radars at Minneapolis, Chicago and Madison. The northeast part of the state is currently out of range of weather radar surveillance; however, a radar is planned by Green Bay in the near future.

Severe Weather

Severe thunderstorm watch: Forecast of possibility of severe thunderstorms, hail and damaging wind.

Tornado watch: Forecast of possibility of one or more tornadoes.

Tornado warning: A tornado is approaching.

Severe thunderstorm warning: A severe thunderstorm is approaching.

Tornado Warning Personnel

State Highway Patrol, Highway Maintenance personnel, Conservation Wardens, local law enforcement officers, firemen, amateur and citizens band radio operators and volunteer spotters rely upon two-way radio communication, telephone and NAWAS to relay information to the Weather Bureau for mass dissemination.

Volunteer spotters are designated trained private citizens who frequently live in rural areas. They often provide our first indications of a tornado traveling toward a city or town. Many schools will undoubtedly be in the tornado watch area. Therefore,

a severe weather spotting unit should be organized to function as spotters when a tornado watch is indicated for the area. Suggest use of science students as "watchers" for school.

Specific Warning: Schools

National Warning System (NAWAS) "fan-out" goes from state to county to city and local officials. An alerting procedure and agreement between the Superintendent of Schools and the proper local warning officers should be made and tested.

The school superintendent should instruct the telephone company that if there is an emergency civil defense message, the operator should break in on a busy circuit to relay the message.

Spotters should be positioned in safe vantage spots to insure sightings of a tornado approching.

Radio Monitors

The school superintendent's office should monitor, on all potentially severe weather days, a radio station that carries Weather Bureau forecasts and storm warnings. The University State Radio Council Network (WHA and affiliated stations) also carry Weather Bureau forecasts and storm warnings.

A battery operated transistor radio or a special voice alerting device in each building can keep administrative personnel abreast of current developing weather conditions. Periodic checks should be made to be sure transistor batteries are

in good condition. If a transistor radio or special alerting device is not available, arrangements should immediately be made to obtain such equipment. Meanwhile, a battery operated radio should be used to monitor weather information.

In-School Warning

Tornado alarm signal should be different, or a variation of the regular fire alarm.

Tornadoes may disrupt the power supply before a warning signal alerts the community. Therefore, a secondary warning system should be devised. This happened at Belmond, Iowa, making intercom and bell systems inoperative.

Special consideration should be given to the location of students the last two periods in the day, and at dismissal time. This is the most critical period of the school day relative to tornado frequency. See Figure 2 on Page 15. Bus drivers should be informed on evasive action (travel at right angles away from the storm) if confronted with a tornado while delivering students to their homes.

> The Superintendent should make the decision on whether students will be kept at school or dismissed during a threatening situation.

School Tornado Readiness Plan

A planning committee should be appointed to assist the principal in developing a plan. Each building is unique in the protective areas that it provides, and the special problems it may present. The planning committee must analyze the problems and adopt a suitable plan to protect the faculty and students. The building architect, contractor or building engineer should advise as to the safest place.

Protected Areas

The protection and safety of the students is a community endeavor. The school board should accept the responsibility for the schools and provide the building principal or a disaster planning committee with consulting architects or engineers, if necessary, to find the safest places. Techniques should be employed in new construction to provide protective areas. The University of Wisconsin Extension Engineering Division offers a free Professional Development Service which provides a professional architectural consultant to assist school boards in providing fallout shelter spaces in new school construction at little or no additional cost. Requests for this service should be made in writing to your local or county civil defense director.

Fallout protection areas in schools provide tornado protection as well. With a short stay time, many more students can be placed in a fallout shelter area than the listed capacity of the shelter.

The Faculty

The faculty must understand the nature of the plan, the specific assigned location they are to take their students, the route to follow, and the course of action required for maximum protection.

Student Movement

Departmental block area movement is suggested to keep a teacher's movement pattern and assigned area basically the same. Traffic should flow in one direction only. Drills in September and early February are good preparation. If major changes occur in a teacher's room assignment, more than one location for tornado protection should be given that teacher.

Special consideration should be given to handicapped children, noon lunch periods and assemblies, and evening events.

Parents

To properly inform parents, a form letter describing the school "Emergency Readiness" Plan should be sent to the parents of each child.

PTA, home and school and any other organizations with school affiliations should be included in drafting the school plan.

Education of Students

To alleviate any fears students may have of weather phenomena, and to develop a basic understanding of weather, a unit on weather should be taught in the elementary grades. In junior high school a more comprehensive unit on meteorology may be taught in an earth science or general science course. For a broad understanding of the sociological implications of disaster, the functions and responsibilities of governmental agencies, and knowledge for family and personal survival techniques, a civil defense education unit is recommended in the high school government or social studies course.

The close cooperation of your local or county Civil Defense Director is required to insure that the schools are included in local and county emergency warning plans.

Tornado Facts

1. 95 percent of Wisconsin's tornadoes occur in April, May, June, July, August and September.

2. Tornadoes occur most frequently from 3:00 to 7:00 p.m. with the 3-4 p.m. period having the highest rate of incidence in Wisconsin.

3. Wisconsin ranks 17th nationally in tornado frequency.

4. During the last ten years, Wisconsin has averaged 18 tornadoes per year.

5. Tornadoes generally move eastward from a westerly or southwesterly direction. In Wisconsin, 80 percent of all tornadoes approach from the west or southwest.

6. A tornado path can vary from a brief touchdown to 170 miles in length.

7. An average ground speed of 25 to 40 m.p.h.

8. The average width of a tornado path is 285 yards with the median being 100 yards.

9. The major causes of injuries in a tornado are flying glass and debris.

10. Tornadoes would rarely last more than a couple of minutes over a spot (such as a school) or more than 15-30 minutes in a 10-mile area. The accompanying rain would, of course, last longer.

Protected Areas

1. Community fallout shelter area in school

2. Underground basements or tunnels

3. Interior corridors and hallways

   a. North and east interior corridors of building

   b. Lowest floors possible

   c. Open windows away from storm direction if time permits

4. Consider protection, if time permits, in nearby buildings if school has little protective area

Unprotected Areas

1. Gymnasiums and auditoriums (they lack the necessary supporting walls to provide suitable protection)

2. South and west upper sections of building

3. Portable classrooms

4. Glassed-in areas

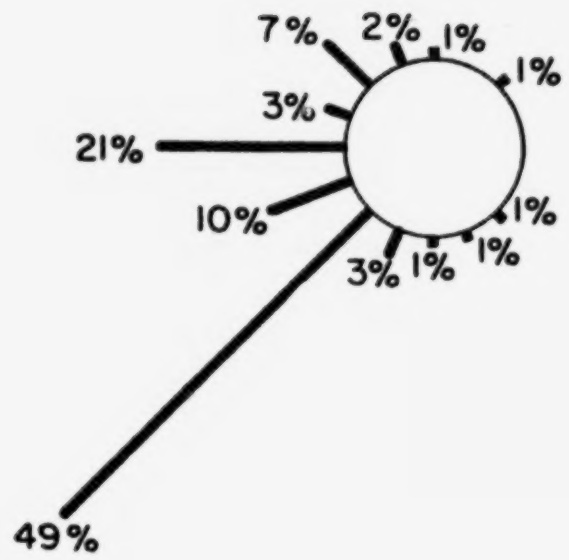

FIGURE 1. Tornado rose for Wisconsin showing percent of reported tornadoes moving from indicated directions, 1916-1964.

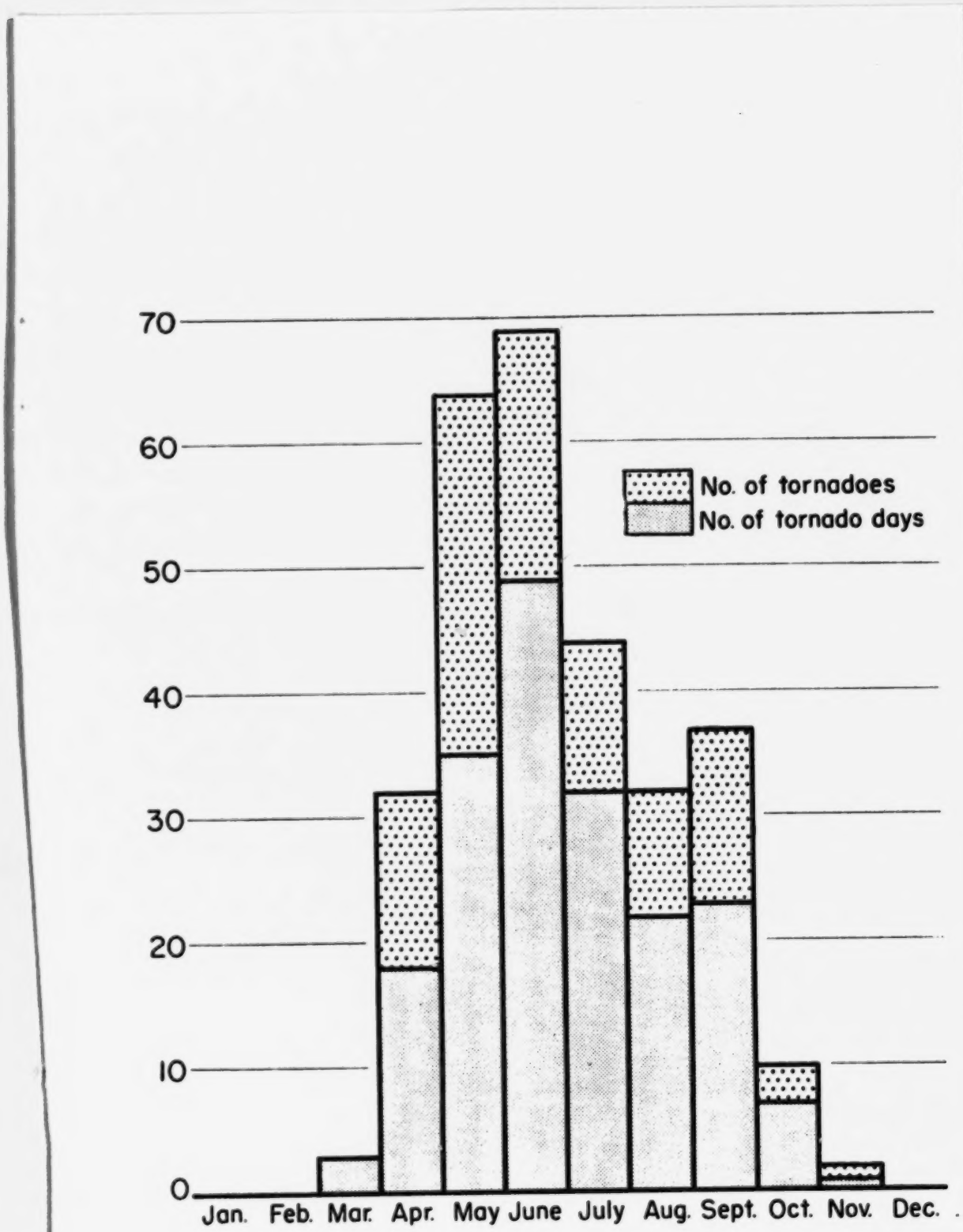

FIGURE 2. Number of tornadoes and tornado days, 1916-1964.

FIGURE 3. Number of reported tornadoes by county, 1916-1964.

FIGURE 4. Outstanding tornadoes from beginning of record through 1964. Where loss of life was at least 5, or property damage was at least $500,000, or path was at least 25 miles long.

TABLE 1. NUMBER OF TORNADOES BY HOUR AND MONTH, 1916-1964

HOUR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
00				1	1	1	1	1	3				8
01				1	1	1	2		1				6
02							1						1
03			1		1	1							3
04						1			1				2
05							2						2
06						1							1
07										1			1
08					1		1						2
09					1								1
10				1					1				2
11			1		1		2		2	1			7
12				2	4	4	3	1	1				15
13				3	6	4	2	3	2		1		21
14				4	11	6	1	4	5	1			32
15				8	7	4	6	6	2	2			35
16				2	9	9	7	4	3	3			37
17				3	7	7	5	3	10				35
18			1	2	7	11	4	5	2				32
19				2	3	5	2	1					13
20					1	4			1				6
21					1	1							2
22					1	2			1				4
23				3	1	7	5	4	2	2	1		25
Unknown													
TOTAL			3	32	64	69	44	32	37	10	2		293

This booklet was compiled jointly by:

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